

REMARKS

The office action of 05/09/2003 has been reviewed and its contents carefully noted. Reconsideration of this case, as amended, is requested. Claims 1 through 30 remain in this case.

Preliminary Comments

The numbered paragraphs below correspond to the numbered paragraphs in the Office Action.

a. The claims were amended as follows, "bar code reader" is changed or elaborated to -- scanning engine--. Specifically:

a. Claims 1, 4, 6, 9, 10, 12, 16, 20, 21, and 22, were amended.

b. In the specifications,

a. In the title wherein "bar code reader" is changed or elaborated to -- scanning engine--.

b. On page 1, line 7 and page 3, line 2; "bar code reader" is changed or elaborated to --scanning engine--.

c. On page 15, line 16, the following paragraph were added:

It is commonly known that scanning systems typically have different subsystems, such as the scanning engine, the optical sensor, and the decoder. Some of the subsystems, such as the decoder may be incorporated into a microcontroller. The interfaces between these different subsystems must support the required processing power and allow one to improve one part of a scanning system without redesigning other systems. A bar code reader is the equivalent of a scanning engine or at least includes the scanning engine. The present invention teaches the use of just a subsystem of a scanning system, i.e. a scanning engine, for detection of missing, misallocated, or defective chain links or other parts. Because the line images derived from the chain links or other parts do not have identical characteristics of a conventional bar code which has to meet certain industry standards, such as ISO/ANSI standards, the line images derived from

the chain link or other parts is not identical as that of the bar codes. Furthermore, the interfaces between these different subsystems must support the required processing power and allow one to improve one part a scanning system. In other words, the present invention uses merely part of a Scanning system, not for scanning a bar code, but for detection of missing, misallocated or defective chain links or other parts.

Rejection(s) under 35 U.S.C. §102

3. Claims 1, 3-20 and 24-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Saka et al. (USP 5,434,792).

Claim 1, as amended, recites as follows:

1. (Currently Amended) A method of detecting missing parts in a workpiece comprising a plurality of parts, comprising the steps of:
- a) moving the workpiece relative to a ~~bar code reader~~ scanning engine;
 - b) detecting a line image across the workpiece with ~~the bar code reader~~ scanning engine, producing a signal output representative of the line image;
 - c) deriving a processed signal from the signal output of the ~~bar code reader~~ scanning engine;
 - d) comparing the processed signal to a reference signal representing a workpiece without missing parts; and
 - e) indicating if the processed signal does not match the reference.

Claim 19, as previously amended, is a parallel apparatus claim to method claim 1. The arguments given below in connection with claim 1 apply equally to claim 19.

The instant Office Action alleges that:

“Re claims 1, 3, 5-9, 14-20, 24-26, 29 and 30, Saka et al. discloses a production system including a method of detecting **missing parts in a workpiece** comprising a plurality of parts (col. 1, lines 65+) comprising the steps of:

- a) **moving** the workpiece relative to a bar code reader (col. 3, lines 66-68 and the workpiece may be a plurality of parts in a container as disclosed in col. 3, lines);
- b) detecting a **line image** *across the workpiece* with the bar code reader (col. 4, lines 35-40) producing a signal output representative of the line image (col. 4, lines 41-42);
- c) deriving a processed signal (a control unit 13 and a line host controller 16) from the signal output of the barcode reader (col. 4, lines 41-42);
- d) comparing the processed signal to a **reference** (work order sheet) **representing a workpiece without missing parts** (col. 4, lines 1-13);
- e) indicating if the processed signal does not match the reference (col. 4, lines 43-54).

The detecting process is accomplished by reading a **barcode label** on a product or an ID card attached to a **product or a pallet** moving along a direction of a conveyer belt by a reader which inherently comprises a light emitting element and a reflected light-detecting unit (usually an array of photodiodes). In addition, an operator controls the start-stop motion of the conveyor belt according to the data read by a reader (col. 4, lines 10-13).”(emphasis added)

Saka teaches a production management system for supplying work order sheets to personnel in a production line, and of transmitting defective product data at each working process to a quality control system. The production system comprises assembling sites and testing sites for testing and inspecting the performance or the quality of an assembled product, at least one line terminal installed at each of the assembling sites and the testing sites, **an ID card attached to a product to match the flow of an article and manufacturing data, including a type and a parts number for each product**, while being transported, a line host controller that reads the data from the ID card via the line terminals, outputs work order sheets for operators via the line terminals, outputs a test result report containing test-inspection record data for each product, and outputs a delivery order sheet for preparation packing to a packing site via a Local Area Network, and a line host control terminal connected to the line host controller.

The first step in Applicant's claim 1 (a) claims moving the **workpiece** relative to a bar code reader, not moving a **barcode** relative to a barcode reader. The Applicant does not claim to have invented moving something bearing a barcode past a barcode reader - that is how barcode readers have been used for many years. To the extent that Saka teaches use of a bar code reader, it is the standard reading of information represented by a bar code relating a product. No bar code is involved in Applicant's independent claims 1 or 19.

The method of Applicant's claim 1 then performs the step of (b) **detecting a line image across the workpiece with the bar code reader, producing a signal output representative of the line image.** The Office Action cited (col. 4, lines 35-40) and (col. 4, lines 41-42) as relevant. However, these sections clearly state that the testing or line terminal "reads the product code and the control number from the ID card..." Clearly, Saka is teaching using a bar code reader to read bar codes, producing an output which is the information encoded in the bar codes - just what bar code readers are always used for.

Finally, the method of Applicant's claim 1 performs step (d) of **comparing the processed signal to a reference signal representing a workpiece without missing parts.** Saka reads barcodes on parts to determine what parts are present, then compares the list of parts present to another list of parts which should be present. Saka does not teach or suggest **detecting a line image and producing a signal representative of the image.** Not having a line image, or a signal representative of the line image, Saka cannot and does not **compare the processed signal to a reference signal representing a workpiece without missing parts.**

It cannot be stressed too strongly that the instant application does not contemplate using bar codes on a workpiece to detect missing parts. The claimed *line image created by the barcode reader* is not a read barcode, but rather represents the *physical aspects or characteristics of a work piece* as it is moved past the reader. A line image is not a bar code, and a signal representing a line image is not a list of parts. A work order sheet is not a **reference signal representing a workpiece without missing parts.**

Furthermore, the Examiner in the instant Office Action admits that Saka teaches:

"[t]he detecting process is accomplished by reading a **barcode label** on a product or an ID card attached to a **product or a pallet** moving along a direction of a conveyer belt by a reader which inherently comprises a light emitting element and a reflected light-detecting unit (usually an array of photodiodes). In addition, an operator controls the start-stop motion of the conveyor belt according to the data read by a reader (col. 4, lines 10-13)." (emphasis added)

Because there is no **barcode label** contemplated by the instant application, the Examiner's admission is evidence that Saka does not contemplate claim 1 of the instant application.

With regard to independent apparatus claim 19, please refer to the arguments put forward in relation to method claim 1. With claims 1 and 19 allowable, claims 4, 10-13, 27 and 28, by virtue of their dependency to claims 1 and 19, are deemed patentable.

In addition, with regard to claim 10, a 'linear image' is not a bar code, and the number derived from the processed linear image is, as is clear from Applicant's specification, a binary number representing physical characteristics of the workpiece, not a detected and interpreted barcode. With regard to claim 12, deriving a number from counting level transitions in a linear image is not reading and decoding a barcode. With regard to claim 13, deriving a binary number in which each bit represents a detection or non-detection of a part on a workpiece is not taught or suggested by Saka's reading a bar code to derive a decimal number which is compared to a list.

Therefore, it is respectfully suggested that the rejection of independent claims 1 and 19 as being anticipated by *Saka* is overcome. Dependent claims 4, 10-13, 27 and 28, (as well as other dependent claims not discussed specifically by the instant Office Action but is included in this rejection), being dependent upon and further limiting independent claims 1 and 19, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

Therefore, it is respectfully suggested that the rejection of independent claim # as being anticipated by *reference* is overcome. Dependent claims # and #, being dependent upon and further limiting independent claim #, should also be allowable for that reason, as well as for the additional recitations they contain. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection(s) under 35 U.S.C. §103

5. Claims 2 and 21-23 were rejected under 35 U.S.C. 103(a) as being unpatentable over Ledvina et al. (USP 4,509,323) in view of Saka et al. (USP 5,434,792). Applicant respectfully disagrees.

The Office Action states:

“Ledvina et al. discloses a parallel-link chain (Fig. 2) having two types of links with a distinguishable physical characteristic from each other. He discloses the links are painted with different colors (selecting colors are designers choice but it would be obvious to select colors distinctive to each other. One of ordinary skills in the art preferably selects a dark color such as black to minimize noise in detecting a reflected light.) and illuminated by a light. An optical detector detects the reflected light and examines for the appropriate color spectrum. Then the link type is verified (page 3-4, (6) of the description of the preferred embodiments).”

In making the rejection, the Examiner further states that "In view of Saka et al, it would have been obvious... to further incorporate a method of reading a bar-code label to identify a missing part ..." Applicant respectfully points out that rather than making the present invention obvious, this points out the very point of difference between Saka and the Applicant's invention, as discussed above: the present invention *does not use bar codes* to identify the parts, but rather *uses a barcode reader to derive a signal representative of a line image* across the workpiece.

As the Examiner says, Ledvina et al. discloses a parallel-link chain (Fig. 2) having two types of links with a distinguishable physical characteristic from each other. Ledvina's two types of links are used so that the noise signature of the chain is reduced by the differently shaped links hitting the sprockets at different times - this is the basis of the "silent" chain. The particular arrangement of types of links can be very important in making a chain for a particular application, to avoid annoying resonances, so Ledvina's invention is a method of distinguishing each of the types of links by back shape or color, and reflecting a light off the links to make sure that the chain was assembled with the correct pattern of links. The reflected light from the links is compared, set by set, to the expected pattern of links, and the chain stopped if the expected pattern is not found (see Ledvina, column 3 line 57, through column 4 line 27). Nowhere in Ledvina is it taught or suggested to detect a missing part in a workpiece by comparing a signal derived from a line image of the entire workpiece to a reference signal indicative of the workpiece without missing parts. As discussed above in connection with the section 102

rejections, which argument is incorporated here by reference Saka does not show this method or apparatus either.

If neither reference shows the invention, the combination of the two (even if possible) cannot make the invention obvious. Applicant respectfully suggests that Saka et al and Ledvina et al are not combinable in that Saka teaches an assembly line for producing small quantity products, in which missing parts are found by scanning barcoded ID tags attached to parts and comparing the list of scanned ID tags to a reference list, and Ledvina teaches a modifying a silent chain with two different kinds of links by changing the reflective characteristics of the backs of the links.

Even if the above two are combinable, which the Applicant disagrees, the resultant system would either be a silent chain with ID tags attached to each link, in which a barcode reader reads the tags and compares the read tag information to a list of the links which should be present, or a system in which the parts in a product are modified to be in two different colors or shapes.

Therefore, Applicant respectfully disagrees with the Examiner in regard to the instant rejection, and believes the claims 2 and 21-23 are patentable over Ledvina et al and Saka et al, individually and in combination, for the reasons given above.

Reconsideration and withdrawal of the rejection are respectfully requested.

Response to Arguments

6. The final office action alleges that Applicant's arguments filed March 04, 003 have been fully considered but they are not persuasive. Specifically, the Examiner states:

Rejection under 35 U.S.C. §102:

The applicant argues that the parts (workpieces) are moving **not** a barcode on page 6, 2nd paragraph. The examiner respectfully disagrees. As the prior art of the record, Saka et al. (US 5,434,792) teaches in column 4, lines 18-22, the bar codes are **attached** to the parts and the parts are moving on the transporting means such as a conveyor. Therefore, one of the ordinary skill in the art would interpret that the both the **workpiece** and the **barcode** are moving relative to a barcode. Furthermore, the applicant states that no bar code is involved in Applicant's independent claims 1 or 19. While the statement **may be true**, the limitations in claims 1 or 19 undoubtedly

can be **broadly interpreted** as a barcode. A barcode is well known in the art to comprise a bar (line) and a space (blank-no line). **A barcode image is an image of a plurality of lines and spaces.** Therefore, a barcode image inherently contains a line image as recited in the step b) of claims 1 and 19. (emphasis added)

Applicant respectfully submits that the Examiner misread and/or misunderstood applicant's statement. The cited statement by the Applicant, i.e. page 6, 2nd paragraph of Applicant's response to Office Action is listed blow for the Examiner's perusal:

"The first step in Applicant's claim 1 (a) claims moving the **workpiece** relative to a bar code reader, not moving a **barcode** relative to a barcode reader. The Applicant does not claim to have invented moving something bearing a barcode past a barcode reader - that is how barcode readers have been used for many years. To the extent that Saka teaches use of a bar code reader, it is the standard reading of information represented by a bar code relating a product. No bar code is involved in Applicant's independent claims 1 or 19".

As can be seen, the above paragraph of Applicant's response to the prior Office Action clearly points out that no bar code is involved in the instant claim. A bar code is a series of parallel lines of varying thicknesses. The thickness of each line represents a known value such as a digit in of an item code for a piece of merchandise in a super market. Please refer to Exhibit A for a bar code usage. (How It Works: Science & Technology 401 Vol.3 3rd Ed. (2003) ISBN: O-7614-7314(9) set)

Instead of having a series of parallel lines representing a known value, what the Applicant claims is a novel way including a method of using scanning engine to scan a workpiece for detecting missing parts of the workpeice.

With regard to the Examiner's citation in Saka, i.e. column 4, lines 18-22, instead of supporting that the instant invention reads on Saka, the Examiner's citation actually points out that Saka teaches away from the instant method in that the bar code thaerein stands for a priorly known value, such as numbers representing such things as the item code for a piece of merchandise in a super market. The cited statement in Saka, i.e. column 4, lines 18-22 the Saka patent application, is listed blow for the Examiner's perusal:

At assembling sites M2 to M6, semi-assembled product terminals or line terminals installed therein read the **product code, control number**, and other data from

the ID card attached to the pallet transported sequentially to the workplaces. The semi-assembled product terminals also read data pertaining to the type, part **numbers**, lot **numbers**, and the manufacturing **dates** of the parts making up the semi-assembled product, for example, from **the bar codes attached to the parts**. The semi-assembled product terminals then transmit the read data to the line host controller. The line host controller informs operators of the above data by outputting the assembly *work order sheets* associated with the assembling sites M2 to M6, which will be stored in the line host controller, to CRT monitors or printers connected to the respective semi-assembled product terminals. The operators start driving transporting means or conveyor belts (not shown) to feed semi-assembled products 1 to 6, which are being assembled, to the assembling sites at the subsequent steps. Finally, the semi-assembled product 6 is transported to a testing site T1. (emphasis added)

As can be seen from the above, which is cited by the Examiner, in Saka a bar code is used to represent known values such as data pertaining to the type, part **numbers**, lot **numbers**, and the manufacturing **dates** of the parts making up the semi-assembled product. On the other hand, the purpose of the present invention is to detect an unknown thing--the missing parts on a work piece. At the start of the method of the present invention, it is not known where the missing parts are if there is a missing part at all. The instant invention teaches a method to determine an unknown thing, i.e. the missing parts. Because of the present invention, the unknown thing became known. Therefore, unlike a bar code representing a known value, the present invention teaches the detection of missing parts in a workpiece using a scanning engine.

In other words, assuming one already knows where the missing parts are, the present invention is not required because what the present invention teaches is a method to know where the missing parts are or if the missing part exists at all. Therefore, even if the applicant claims the usage of a bar code reader that detects a line image across the workpiece, it is still deemed patentable. However, in order to pass the present invention timely to issue, Applicant has amended the claims wherein the language of "bar code reader" is changed to "scanning engine". Further, the line image across the workpiece is not a bar code, representing a known value, that is being read. In other words, the present invention detects an unknown thing such as a line image representing missing parts.

One of the significant distinction of the instant invention is that there is a difference between a bar code **attached** on something and a method of detecting **missing** parts in a workpiece, of unknown location, using a scanning engine. As point out above each line that

makes up a bar code has a predetermined dimension representing a predetermined value. whereas on the other hand, the present invention teaches a method that detects a line image across the workpiece using the bar code reader.

Furhtermore, unlike Saka which teaches bar code being attached to the parts, the present invention does not teach any extra thing attached to the parts. On the contrary, it is the missing parts in a work piece that is being detected. In other words, instead of attaching an extra lable on something that is known, the present invention teaches the finding of something that is missing without introducing any extra thing such as a bar code. The Examiner seems to insist that one of the ordinary skill in the art would interpret that the both the **workpiece** and the **barcode** are moving relative to a barcode. This may be true in Saka, but the present invention teaches detecting missing parts (an unknown thing) of the workpiece without any extra bar code (representing a known value) whatsoever. To add a lable such as a bar code to a workpiece which may or may not have a missing part is not the same as trying to find some missing parts of a work piece. In other words, adding a lable such as a bar code to a workpiece which may or may not have a missing part is not what is claimed in the instant application. Therefore, whatever Saka teaches do not read at all on the present invention.

The Examiner furhter states that “the limitations in claims I or 19 undoubtedly can be **broadly interpreted** as a barcode”. The Applicant, in his arguments supra, has pointed out otherwise. However, even if the limitations in claims I or 19 undoubtedly can be **broadly interpreted** as a barcode, which necessarily means something that represents a known value, an illogical conclusion is thus drown in that in order to detect something unknown, one needs to know that thing before hand in that something such as a missing part is known to us and we attached a bar code thereto so that it is known that a missing part is there. However, if that is the case, it bags the question as to how the place that has the bar code attached is the missing part location. In other words, the missing location needs to be known before a bar code is attached thereto. The present invention teaches a means of finding the missing location. Whether a bar code is attached to the location, or any location is not claimed by the present invention.

The Office Action furhter states that:

The applicant argues in the 4th paragraph on page 4, applicant argues that Saka does not teach or suggest detecting a line image and producing a signal representative of the image. Saka et al. teach in col. 7 lines 11+ explains the **comparing process to identify whether a product is missing a part or not**. It is only **logical** to compare the status of assembly/product line with a complete product with no missing parts. A data with a complete product is a reference and the representation of the complete produce is a signal that would be compared with the status of the assembly/product line. It would not make sense to compare the status with a missing part. Therefore, the applicant's argument is not persuasive.

The Applicant cannot find the relevant arguments in the “**4th paragraph on page 4**”, which the Examiner has cited. It is respectfully requested that the Examiner clearly point out where the relevant arguments are in order for the Application to clarify or somehow do something in order to pass the present application speedily to issue. For relevant arguments on Saka does not teach or suggest detecting a line image and producing a signal representative of the image, please refer to arguments else where in this document.

With regard to col. 7 lines 11+ of Saka, the whole paragraph is listed below for the Examiner's perusal:

The contents of the memory will be described as a supplement. Fixed data represents a leading address of a memory area and is set to 0. The products code and the control number indicate a product type and a parts number respectively. The presence or absence of a defect indicates whether or not a part is missing or an abnormality is found in the results of a **test**. The line-out flag provides identification data indicating that a product should be neither assembled nor tested until a product, in which a defect is detected, reaches the first retiring space. The line-in flag specifies re-entry; that is, provides data indicating whether or not product is retired, or in which process a retiring order is issued. For example, 00 represents No Retired Product. 01 represents Retire Order issued in Process 1. Selection of VH or VL indicates whether VH or VL is set to an automatic power change unit installed at a testing site T4. Line-out Process indicates a process in which a product is retired. Pallet Return is data indicating whether a pallet should be returned to a leading process by passing through or bypassing the high-temperature aging apparatus. The re-entry flag specifies whether or not the product is a re-entered article. The No.1 Keep flag specified whether or not to load a test program. The No.2 Keep flag specifies whether or not to load an operating system on a hard disk. Automatic voltage Change of VN, VL, and VH indicates whether a product has an automatic voltage change function.

The above paragraph in Saka teaches the content of a memory or defining the fields of the memory. Nowhere is the comparing process to identify whether a product is missing a part or not is explained or taught herein. The only thing that seems somewhat related is the

mentioning of the word “test” proceeded by an indefinite article “a”. However, the content or the steps involved in the test is not mentioned anywhere in Saka.

As can be appreciated, the detection of missing parts can be done in a number of ways including using the naked eye and other means mentioned in the Background section of the instant application. But, the method as claimed by the instant application is not taught or suggested by Saka.

The Office Action further states that:

Rejection under 35 U.S.C. 103 (a):

As discussed above in connection with rejection under 35 U.S.C. § 102(b), the 103(a) rejection is maintained. Furthermore, in response to the applicant's argument about the invention not using a bar code, it is respectfully suggested to particularly point out and distinctly claim the invention over the cited prior art.

For the reasons stated above, the rejections (102 b and 103 a) of claims 1-30 are maintained.

It is respectfully pointed out that the negative limitation of “the invention not using a bar code” as suggested by the Examiner is not necessary in that the present invention is not using a bar code reader to read to bar code (a known thing as well as an extra thing), but to read a workpiece having missing parts (an unknown thing). For detailed arguments, please refer supra.

Applicant emphatically and respectfully calls the Examiner's attention that a “work piece” as claimed is **not** a bar code. For example, a chain with missing parts is not a bar code wherein each line thereof has a predetermined dimension representing some know value. One does not know whether is workpiece has missing parts at all at the start of the method.

The present invention teaches a novel method of using a scanning engine for detection of missing, misallocated or defective chain links or other parts. Applicant believes that the claims as they stand after the previous response to the Office Action of 01/02/2003 are patentable and are in condition for allowance.

However, in order to advance the present application to issue, applicant filed the instant Request for Continued Examination (RCE) under 37 CFR 1.114. Applicant has amended languages in the specification and claims, specifically

“bar code reader” is changed or elaborated to --scanning engine--.

It is commonly known that scanning systems typically have different subsystems, such as the scanning engine, the optical sensor, and the decoder. Some of the subsystems, such as the decoder may be incorporated into a microcontroller. The interfaces between these different subsystems must support the required processing power and allow one to improve one part of a scanning system without redesigning other systems. A bar code reader is the equivalent of a scanning engine or at least includes the scanning engine. The present invention teaches the use of just a subsystem of a scanning system, i.e. a scanning engine, for detection of missing, misallocated, or defective chain links or other parts. Because the line images derived from the chain links or other parts do not have identical characteristics of a conventional bar code which has to meet certain industry standards, such as ISO/ANSI standards, the line images derived from the chain link or other parts is not identical as that of the bar codes. Furthermore, the interfaces between these different subsystems must support the required processing power and allow one to improve one part of a scanning system. In other words, the present invention uses merely part of a Scanning system, not for scanning a bar code, but for detection of missing, misallocated or defective chain links or other parts.

The contents of the above paragraph are facts commonly known to technicians skilled in the art. No new matter is added herein. For some of the commonly known facts, the applicant respectfully points out the existence of which in issued U.S. patent US6,382,512 by Chang Yu-Chun, entitled SIGNAL READING CONTROL APPARATUS FOR BARCODE SCANNER.

Conclusion

Applicant believes the claims, as amended, are patentable over the prior art, and that this case is now in condition for allowance of all claims therein. Such action is thus respectfully requested. If the Examiner disagrees, or believes for any other reason that direct contact with

Applicants' attorney would advance the prosecution of the case to finality, he is invited to telephone the undersigned at the number given below.

"Recognizing that Internet communications are not secured, I hereby authorize the PTO to communicate with me concerning any subject matter of this application by electronic mail. I understand that a copy of these communications will be made of record in the application file."

Respectfully Submitted:

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By: _____

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